

## Conduction by Ice and Solid Salts 41

### § 4. *On Conducting Power generally \**

154. It is not my intention here to enter into an examination of all the circumstances connected with conducting power, but to record certain facts and observations which have arisen during recent inquiries, as additions to the general stock of knowledge relating to this point of electrical science.

155. I was anxious, in the first place, to obtain some idea of the conducting power of ice and solid salts for electricity of high tension (128), that a comparison might be made between it and the large accession of the same power gained upon liquefaction. For this purpose the large electrical machine (26) was brought into excellent action, its conductor connected with a delicate gold-leaf electrometer, and also with the platina inclosed in the ice (119), whilst the tin case was connected with the discharging train (28). On working the machine moderately, the gold leaves barely separated; on working it rapidly, they could be opened nearly two inches. In this instance the tin case was five-eighths of an inch in width; and as, after the experiment, the platina plate was found very nearly in the middle of the ice, the average thickness of the latter had been five-sixteenths of an inch, and the extent of surface of contact with tin and platina fourteen square inches (120). Yet, under these circumstances, it was but just able to conduct the small quantity of electricity which this machine could evolve (107), even when of a tension competent to open the leaves two inches; no wonder, therefore, that it could not conduct any sensible portion of the electricity of the troughs (120), which, though almost infinitely surpassing that of the machine in quantity, had a tension so low as not to be sensible to an electrometer.

156. In another experiment, the tin case was only four-eighths of an inch in width, and it was found afterwards that the platina had been not quite one-eighth of an inch distant in the ice from one side of the tin vessel. When this was introduced into the course of the electricity from the machine (155), the gold leaves could be opened, but not more than

half an inch;  
the thinness of the ice favouring the conduction of  
the electricity,  
and permitting the same quantity to pass in the  
same time,  
though of a much lower tension.

157. Iodide of potassium which had been fused  
and cooled

<sup>1</sup> In reference to this § refer to paragraph 718, and the  
results connected  
with it.—December 1838.